SOME OBSERVATIONS ON THE DISSEMINATION OF TRIPSACUM

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The observations reported here on the dissemination of *Tripsacum* are the results of a continuing attempt to uncover more information on this grass which might shed additional light on its evolutionary relationship with maize. In particular, we were interested in *Tripsacum floridanum* because it has certain features which are primitive for the genus. It is endemic to south Florida and crosses more easily with maize than do most other species of *Tripsacum* (Galinat, 1961). Since our previous collections of *T. floridanum* had all been from Dade County and chiefly in the Everglades National Park, we set out to botanize for this grass in Collier County, an area of greater geological age than that of Dade County.

On our trip westward along the Tamiami Trail in Collier County, we were able to make our first observations. They suggested water as a factor in the spread of *Tripsacum*. The relationship between the highway and a canal along one side, created by the road construction technique used in south Florida, made possible these observations. While we were driving westward, the canal lay on our side of the highway and, after a few checks for accuracy, we began to count colonies of *T. dactyloides*, while traveling at a speed of at least 40 miles per hour, slower speeds being hazardous on this highway. The characteristic clumps of plants with arching, rather broad grass leaves together with scattered tall flowering canes bearing tassel-like inflorescences enabled us to identify this plant with ease and rapidity. In one 25 mile long strip, we observed in this manner about 25 colonies of *Tripsacum*. On the return trip along the same length of highway but on the other side which lacked an abutting canal, we observed only one colony of *Tripsacum*. It seemed possible that flotation along the canal, perhaps during periods of high water, had a role in spreading the

Tripsacum on the canal side and, thereby, resulted in its higher frequency there.

Other observations suggesting that water is involved in the spread of *Tripsacum* came from the distribution of *T. floridanum*, the prime object of our trip to Collier County. This species is most frequently located at the margin of the slightly higher limestone where it protrudes into the marl land which characterizes the glades. It would seem that the *Tripsacum* fruit cases float across the usually flooded glades and become established on the out-cropping of limestone which forms pine hammocks. The *Tripsacum* usually does not migrate far into the pine land from its beach head, unless the undergrowth, such as saw palmetto, is sparse, and unless the canopy is sufficiently open to permit penetration of diffuse to full sunlight.

With these field observations in mind, we went to the laboratory and readily demonstrated that the mature grain-bearing fruit cases of *Tripsacum* did, indeed, have this essential capacity to float on water. In this experiment, thirty-three fruit cases were spilled out into a beaker full of water. They immediately began to float, and during the following week only about a quarter of them sank, as shown in Table I.

Table I. The floating capacity of mature fruit cases of *Tripsacum dactyloides*.

Days on water	Percent floating
0	100
1	94
2	85
3	82
4	76
5	73
6	73

Slight differences in the tightness with which the cupule wings clasped the outer glume of the enclosed spikelet, differences in the density of hairs in the pulvinus notch through which water may enter and differences in the shape and thickness of the rachis segment appear to have affected the floating capacity of the fruit cases. If we assume that

a good floating capacity had some selective advantage as a means of dispersal, then the structure of the fruit cases may have been altered along these lines.

We have also made a few observations on factors other than water which seem to be involved in the spread of *Tripsacum*. During the few stops that we made along the Tamiami Trail drive, we noted that the seasonal mowing of the banks by the State Highway Department seemed to stretch the colonies out, as if by dragging from the mowers moving parallel to the banks. This mowing, furthermore, seemed to aid the growth of *Tripsacum* by temporarily eliminating competition for light by other plants which made a slower recovery from being cut back.

Fire, like the mowing, likewise seems to be important in keeping an area sufficiently open for *Tripsacum*, at least in the case of *T. floridanum* on pine land. The rhizomes of *T. floridanum* are fairly fire-resistant and a regrowth of its shoots is frequently the first sign of green in a fire-blackened area. The numerous, tightly packed leaf bases of *Tripsacum* usually protect the growing points on the rhizomes from destruction by fire. Furthermore, the burning off of some of the mass of dead, usually wet, leaf bases seems to stimulate new growth from the axillary buds. The sprouting of these buds may stem from both the physical removal of enclosing dead tissue as well as the removal of an unfavorable chemical environment immediately around the growing points.

Another most interesting means of dispersal of *Tripsacum* came to light in a story related to us by a farmer, Mr. Glenn Simmons. Mr. Simmons was quite familiar with *T. floridanum*, in that a large growth of it occurs in the pines around his farm. He said that the local inhabitants frequently carried a pocket full of the fruit cases to chew when out on hunting trips in the Everglades. The fully matured *Tripsacum* fruit cases which are much too hard to chew were sometimes cracked open with the teeth and the grain shelled out for eating. But if the mature fruit cases were either swallowed whole or just discarded to the ground, they

might became effectively dispersed. At least in the case of teosinte, Garrison Wilkes (unpub.) reports that cattle do pass the fruit cases through the digestive tract and that the seed recovered from the manure remains viable. Man is known to have chewed teosinte for a considerable period of time. The senior author has identified fragments of a teosinte fruit case in human coprolites from Romero's Cave in Tamaulipas, carbon-dated at 3650±250 years (E. O. Callen, personal communication).

The possibility that birds such as ducks may be involved in the dispersal of *Tripsacum* has also been considered. Experiments are contemplated for testing this by feeding *Tripsacum* fruit cases to chickens or domestic ducks and then spreading the recovered dung out on the ground where any viable fruit cases may germinate.

In the case of teosinte, the indigo bunting, certain grosbeaks and sparrows in Guatemala consume the seed by shelling it out of the fruit case. The result is a complete digestion and destruction of the seed (Stadelman, 1939).

Isolated plants and small colonies of *Tripsacum* are occasionally found far removed from presently existing glades or other water sources. These exceptional plants may have been transported to such places by other means or else they may represent relic survivors from ancient distributional patterns.

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